Guidelines for Management of Contaminated Sites in Nova Scotia

NOVA SCOTIA
Environment and Labour

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PART I. PREAMBLE

This guideline describes the process to be followed by owners and government in Nova Scotia to manage (i.e. to identify, assess, remediate or otherwise act at) land that has potential for unacceptable impacts or risks associated with the presence of contaminants. The attached flow chart defines the steps in the overall management process. The guideline identifies the following components:

- objectives of the process at each step
- required actions and available alternatives
- responsibilities of the site owner or site operator, the regulator and the site professional
- definitions, guidelines, other relevant information

The overall purpose of the guideline is to allow site owners to assume responsibility to the maximum extent possible, for appropriate and cost-effective management of contaminated sites, while ensuring that a consistent approach is used for all sites and that the public interest is protected.

The criteria for making decisions to conduct specific remedial action is outlined in the following situations:

- off-site unacceptable impacts and/or
- unacceptable on-site impacts or risks to human health and safety and/or
- unacceptable on-site impacts or risks to the environment exist

Where none of these situations exist, and the site is under continued, unchanged operation, an alternative site management approach will generally be acceptable. However any change in conditions or new information, particularly relating to land-use, will require a re-evaluation of the management approach.

This guideline defines the stage at which formal notification must be made to Nova Scotia Environment and Labour (NSEL) regarding a site, the information that must be provided, and the process by which will maintain updated files of specified information on notified sites.
The ability to use alternate dispute resolution is an integral component of the process.

DEFINITIONS

Acceptable impact or risk	A contaminant-related impact or risk which does not result in an adverse effect.
Act	Nova Scotia Environment Act, S.N.S. 1994-95, C.1
Adverse effect	As defined in the Act.
Alternate Dispute Resolution	A voluntary process which should be utilized prior to invocation of the powers in Section 14(1) of the Act.
Arbitration Panel	The person or people who act in the arbitration process to resolve disagreements or disputes.
Certificate of Compliance	A certificate provided to NSEL in a prescribed format confirming that the guideline has been followed and that the remedial objectives have been met.
Notification Report	A summary report submitted to NSEL in a prescribed format containing information about a site where unacceptable contaminant impacts or risks have been identified.
Owner	Refers to the "Registered Owner" as defined in the Act.
Phase 1 Environmental Site Assessment (ESA)	A preliminary but comprehensive investigation and evaluation of all available historical and current information about a site, to determine whether potential exists for contaminants to be present that may cause any of the unacceptable impacts defined in 1.2(c) of this guideline. Intrusive investigation (ie. subsurface testpits, boreholes or monitor wells) is generally not conducted in a Phase I ESA
Phase 2 ESA	A more extensive evaluation, including intrusive investigation, to confirm the presence of contamination, although usually not sufficient for full characterization of the extent and degree of contamination.

Phase 3 ESA	A complete evaluation, (including further intrusive investigation if necessary), sufficient to fully characterize the extent and degree of contamination to determine remedial objectives using a Tier I or Tier II approach, and to investigate the feasibility and practicality of remedial options.
Primary Arbitrator	A person whose qualifications meet or exceed the minimum requirements established by NSEL for the purpose of this guideline and who acts as the single arbitrator or who chairs the Arbitration Panel to resolve disagreements or disputes.
Primary Mediator	A person whose qualifications meet or exceed the minimum requirements established by NSEL for the purpose of this guideline who acts to resolve disagreements or disputes.
Regulator	The appropriate representative of NSEL acting as an agent of the Government of Nova Scotia.
Remedial Action Plan (RAP)	A report that identifies remedial objectives for a site, identifies remedial options and outlines their feasibility, and recommends and describes a preferred conceptual remediation plan.
Remedial Objectives	The objectives established for a specific site to be met by the implementation of a remedial action plan.
Site Operator	Any person, other than the Owner, responsible for activities carried out at a site.
Environmental Site Professional	A person whose qualifications meet or exceed the minimum requirements established by NSEL who is responsible for ensuring that the process is followed at a site, and for determining and implementing actions at the site.
Site evaluation	The process of obtaining, compiling, analyzing and drawing conclusions from all appropriate environmental information related to a site with respect to potential impacts or risks.
Tier I approach	The identification of impacts or risk by comparing detected concentrations of contaminants with accepted guideline values. Requires the owner to

	remediate the site to the guideline concentrations appropriate for the intended future land use of the site. This approach is generally conservative in meeting several fundamental objectives: to protect human health, safety and the environment and to enable sale or alternate site use with minimum future liability. The NSEL will likely only be involved in dealing with site sensitivity issues and will provide minimal technical input into this approach.
Tier II approach	Identifies potential risk by comparing detected concentrations of contaminants with acceptable values. These values are determined by calculating the potential adverse effects associated with exposure to contaminants at those concentrations, on a site-specific basis. Conditions that would be acceptable for the site can then be identified. (Technical involvement from NSEL may be required for this approach).
Unacceptable impact or risk	A contaminant-related impact or risk which results in an actual or potential adverse effect.

PART II. THE CONTAMINATED SITE MANAGEMENT PROCESS

No aspect of this guideline eliminates any obligation to comply with any other existing Act or Regulation and to act immediately with respect to any direct and immediate threat to human health or the environment.

1. NOTIFICATION

1.1 Objective

If the Owner of a site is notified or knows that the site is potentially contaminated, the Owner shall evaluate the potential impacts and risks to determine what action, if any, is required by the Process. The Owner shall then advise the notifying party (if applicable).

1.2 Required Actions

a. If a person identifies a site where unacceptable contaminant impacts or risks are suspected, and notifies the Owner or Site Operator in writing, then the owner/operator shall act according to the Process defined in this section.

b. If such notification is made in writing to the Site Operator then the Site Operator shall forward this notification to the Owner within 14 days.

c. The Owner shall then evaluate the site in a reasonably timely manner to determine whether there are:

- off-site impacts
- unacceptable on-site impacts or risks to human health and safety
- unacceptable on-site impacts or risks to the environment

d. If none of the impacts or risks in 1.2(c) are identified, no further action shall be required under the process. The Owner shall advise the notifying party in writing.

e. If any of the impacts or risks in 1.2(c) are identified, the Owner shall do all of the following in a reasonably timely manner:

    - advise affected third parties if appropriate
    - determine whether active remediation or ongoing site management is to be implemented
    - submit a contaminated site Notification Report to NSEL in the designated format

f. Any direct and immediate threat to human health or the environment shall be dealt with immediately, and separately from this Process.

1.3 Minimum evaluation process to determine whether active remediation is to be implemented or ongoing site management is required as in 1.2(c) and (e).

The presence of contamination with the potential to cause unacceptable impacts may be identified by using one or more phases of Environmental Site Assessment (ESA) techniques as defined.

Once the extent and degree of contamination has been identified, the likelihood of unacceptable impacts at the site under present or reasonably foreseeable future conditions will be determined by the following, or an equivalent, minimum evaluation process:

a. Determine the current land-use and subsequent site sensitivity on and around the site.

b. Determine any off-site impacts using a Tier I approach. The identification of off-site impacts will generally require specific remedial action. (The possible acceptability of a Tier II approach for evaluation of off-site impacts will be subject to the approval of NSEL and other affected parties).

c. Determine on-site impacts using a Tier I approach. Where contamination has

been identified on- site, but criteria are not exceeded, ongoing site management will generally be permissible if no change in land-use is planned (i.e. for continued use of operating sites).

d. Where a Tier I approach determines that criteria are exceeded, specific remedial action will be required unless a Tier II approach justifies the alternative of ongoing site management. This will likely only be required for continued use of operating sites.

e. A Tier II approach will normally assist in developing the most appropriate and cost-effective future site actions while determining whether ongoing site management or remediation is required.

1.4 Responsibilities during Notification Stage

The responsibilities of the Site Operator shall include:

- notifying the Owner of all actions occurring under this Process

The responsibilities of the Owner shall include:

- all actions required to comply with the Process described in this section
- evaluating types, levels of impacts, and risks at the ite
- immediate action, if immediate threat to human health or the environment is known or suspected
- if no impacts or risks under 1.2(c) are identified, advising notifying parties in writing
- if impacts or risks under 1.2(c) are identified, deciding actions and submitting a Notification Report to NSEL in the designated format

The responsibilities of the Site Professional shall include:

- executing the instructions of the Owner
- determining whether actions and instructions of the Owner comply with the Process
- advising the Owner in writing if actions and instructions do not comply with the Process
- advising the Owner verbally immediately and in writing as soon as practicable, but within 48 hours, of the identification of any immediate and direct threat to human health or the environment notification to NSEL should the Owner fail to take appropriate action with any immediate and direct threat to human health or the environment

Note: The responsibilities of the Regulator during the notification stage are outlined in Section 3.2.

2. SITE ACTIONS

2.1 Objective

The owner of a site where unacceptable impacts or risks have been identified shall be responsible for all actions taken, including active remediation, ongoing site management, and identification of any changes in conditions or information that might require alternative actions.

2.2 Required Actions

If active remediation is required, the owner shall ensure that:

a. A Remedial Action Plan (RAP) is prepared and submitted to NSEL if required.

b. The Remedial Action Plan (RAP) is implemented and all reports or other information are submitted to NSEL if required.

c. The Remedial Objectives defined in the RAP are evaluated and all information is submitted to NSEL if required.

d. The RAP is meeting the Remedial Objectives and if not, the RAP is revised and the process is re- entered at 2.2(a).

e. A Certificate of Compliance (COC) is submitted to NSEL once the Remedial Objectives are met.

In all cases, whether following from or separate from 2.2 (a)-(e), the owner shall ensure that:

f. The site is managed in a manner that does not worsen impacts.

g. Site monitoring is conducted to ensure adequate site management is maintained.

h. If any changed site conditions or new information is identified, a re-evaluation will be conducted.

i. Based on the re-evaluation in 2.2(h), a decision on further actions will be made and the process shall be re-entered at 1.2(a) if required.

2.3 Responsibilities during Site Actions stage

The responsibilities of the Owner shall include:

- all actions required to comply with the Process in this section
- submitting all required information and reports to NSEL

The responsibilities of the Site Professional shall include:

- executing the instructions of the Owner
- determining whether actions and instructions of the Owner comply with the Process
- advising the Owner in writing if actions and instructions do not comply with the Process
- preparing the Remedial Action Plan (RAP)
- supervising implementation of the RAP
- evaluating the performance of the RAP
- providing factual reports to the Owner
- preparing a Certificate of Compliance (or letter of non-compliance) with the Process
- preparing a plan for ongoing site management
- monitoring ongoing site management operations
- evaluating information relating to changed conditions and reporting to the owner if required

Note: The responsibilities of the Regulator during the Site Actions stage are outlined in Section 3.3.

3. ROLE AND RESPONSIBILITIES OF THE REGULATOR

3.1 Objectives

The primary role of the regulator is to ensure that this Process is followed.

3.2 Responsibilities During the Notification Stage Shall Include:

a. Receiving the notification report.

b. Upon receiving a Notification Report from the Owner stating that action is required at a site, the NSEL shall:

- open a site file

- decide if ongoing involvement is required during the Process, and advise the Owner
- receive all reports and information submitted as required by the Owner

c. Evaluating suspected concerns identified and reported to the NSEL. This evaluation will be limited to determine whether the guideline shall be followed considering the impacts and risks outlined in 1.2(c).

d. Based on the results of 3.2(c), notifying the Owner and reporting party in writing if no specific action is required.

e. Based on the results of 3.2(c), notifying the Owner in writing if the guideline process is to be followed.

3.3 Responsibilities During the Site Actions Stage Shall Include:

a. defining, reviewing and accepting site sensitivity classifications
b. maintaining the site file
c. ongoing involvement as required, on a cost-recovery basis
d. providing a list of approvals for addition of remedial substances to the environment

3.4 Other Responsibilities of the Regulator

a. auditing and enforcing the Process as required
b. receiving the Certificate of Compliance from the Owner
c. updating site files as required
d. providing minimum approved qualifications for Site Professionals
e. providing information to the public where appropriate

4. ALTERNATE DISPUTE RESOLUTION

4.1 Objectives

Alternate Dispute Resolution is the preferred course of action to resolve disagreements or disputes between parties. The objective of Alternate Dispute Resolution is to ensure that resources are used cost-effectively during the site management process, rather than being diverted to litigation.

4.2 Required Actions

a. If a disagreement or dispute between the Owner, other affected parties, or the NSEL remains unresolved, any party may give written notice to the others requesting the unresolved issues to be submitted for alternate dispute resolution.

b. All parties shall agree on the appointment of a Primary Mediator or Arbitrator, who

will allocate costs and shall be qualified in accordance with guidelines established by NSEL. If the parties fail to agree upon the appointment of a Primary Mediator or Arbitrator, the Minister may appoint one who may be any person the parties have considered, or any other Primary Mediator or Arbitrator the Minister considers appropriate.

c. If mediation is chosen, the Primary Mediator shall appoint the appropriate persons to assist the Primary Mediator in the mediation process

d. If arbitration is chosen, all parties shall agree upon the appointment of the additional arbitrators (if required) and failing this, shall agree upon the type of expertise and experience required, in which case the Primary Arbitrator shall appoint appropriate additional persons to the Arbitration Panel.

e. Should any party refuse alternate dispute resolution under these circumstances then the powers of the Act (Part VIII) shall prevail.

f. Other terms and conditions of alternate dispute resolution shall be established separately for each case.

4.3 Responsibilities

The responsibilities of the Primary Mediator, Arbitrator or Arbitration Panel shall be established separately for each case submitted for Alternate Dispute Resolution.

PART III. OTHER TECHNICAL GUIDELINES

Assessment and Remediation Standards, Guidelines and Criteria

1. Current applicable standards, guidelines and criteria published by the Canadian Council of Ministers of the Environment (CCME) and adopted by NSEL may be used in this process.

2. Other contaminated site standards, guidelines and criteria accepted or published by NSEL for specific applications and purposes, such as petroleum hydrocarbon remediation criteria, CSA standards, or other technical guidance documents accepted by NSEL.

Minimum Guidelines for a Tier II Approach

A Tier II approach will determine the likelihood that human or ecological receptors exposed to contaminants at a site may be adversely affected, or alternatively conditions which would be acceptable for the site. A Tier II approach will generally comprise four components:

- A hazard assessment , which determines whether each specific contaminant at

a site can cause adverse effects, and the nature of these effects.

- A dose-response assessment, which determines the relationship between the dose of each contaminant received by any given receptor and the expected adverse effect on that receptor.

- An exposure assessment, which identifies the type and number of individual receptors who are likely to be exposed at or around a site, identifies the pathways by which contaminants may reach these receptors, and estimates the likely exposure dose for each receptor.

- A risk characterization using the results of the first three steps to calculate the overall probability of adverse effects occurring, or the conditions which would be "acceptable", for each "risk scenario" (combination of hazard, exposure pathway and individual receptor or receptor group). This will determine the resulting overall risks, or conditions which would be acceptable, for the site.

A Tier II approach will follow standard and widely accepted procedures for evaluation in each of these four components, such as those described in *"Guidelines for Ecological and Human Health-Based Risk Assessment for Contaminated Sites (CCME, 1994)"*.

Minimum Guidelines for Content of a Performance Evaluation (2.2 c)

An evaluation of the performance of a Remedial Action Plan will include the following minimum components:

1. A clear definition of the Remedial Objectives, from the Remedial Action Plan (RAP).

2. The preparation of a monitoring plan before the RAP implementation which includes the following:

    - parameters to be monitored and measured
    - when, where and how data is to be collected, analyzed and reported
    - how satisfactory RAP performance will be confirmed during operation
    - how the meeting of remedial objectives will be reported

3. All work carried out in accordance with the plan

Note: The data collected to evaluate the RAP performance should be sufficient to allow characterization of the extent and degree of contamination to an accuracy similar to that used during preparation of the RAP.

Minimum Monitoring Requirements for ongoing Site Management

A monitoring plan for ongoing site management shall include (as a minimum) the following components:

1. Clear definition of the monitoring objectives
2. Definition of parameters to be monitored or measured
3. When, where and how data is to be collected, analyzed and reported
4. How acceptable and unacceptable results will be determined
5. What procedures will be followed if unsatisfactory results are obtained.

Note: The data collected to evaluate the site management performance should be sufficient to allow the extent and degree of any contamination and resulting impacts to be estimated to an accuracy similar to that used during the initial evaluation of those impacts.

Minimum Qualifications for Licensed Environmental Site Professionals

The minimum requirement for a Licensed Environmental Site Professional shall be an appropriately qualified and experienced person who is licensed to practice in Nova Scotia by a scientific or engineering organization, and who is accountable for such a license to that organization.

Such a person shall be either:

- An appropriately experienced and knowledgeable professional licensed by the Association of Professional Engineers of Nova Scotia.

or

- An appropriately experienced and knowledgeable person licensed by a licensing body authorized in writing by the NSEL Director of Resource Management and Pollution Control (or Alternate). In this case the licensing body shall be a Board consisting of persons with appropriate scientific and engineering expertise as approved by the Director or Alternate. A potential licensee shall demonstrate in writing, and if necessary in personal interview, to the satisfaction of the Board an appropriate level of knowledge and experience in all aspects of contaminated site investigation, remediation and management. Any such organization will be required to actively pursue professional status pursuant to the Professions Act of Nova Scotia and will be given three (3) years to do so upon implementation of this guideline.

The licensing body must demonstrate to the satisfaction of the NSEL Director of Resource

Management and Pollution Control (or Alternate) additional responsibility and accountability for:

- setting, publishing and enforcing appropriate professional standards;
- developing appropriate training and continuous education programs;
- identifying appropriate upgrading requirements for license renewal.

Minimum Approved Qualifications for Primary Mediators and Arbitrators

A Chartered Mediator or Arbitrator, as approved by the National Accreditation Committee of the Arbitration and Mediation Institute of Canada Inc agreed to by the parties or the Minister who is able to act appropriately in a situation given knowledge of the circumstances, the parties and relevant technical issues, if any, given to that person.

or

An individual who has the appropriate qualifications, experience and knowledge in the process of mediation or arbitration to undertake the tasks the parties or the Minister have assigned. Particular emphasis will be placed on the ability to identify issues, interests and common ground and develop agendas and options with the objective of overall dispute resolution. Qualifications and experience shall be related to the task assigned with appropriate regard given to the nature of the dispute, the parties involved and the technical issues, if any, that are part of the dispute.

Required Format for Certificate of Compliance

A Certificate of Compliance shall be completed and signed by the Site Professional responsible for the management of the remediation project. The Certificate of Compliance shall include the following prescribed wording:

1. All work was overseen by competent persons;

2. All reports and other documents related to this site work have been delivered to the owner of the property identified in this certificate, who has been advised to retain these for permanent reference. These documents are deemed to be the property of the site owner who has been advised that they must be transferred to any new owner;

3. The site has been assessed, remediated and/or managed in accordance with the Guidelines for Management of Contaminated Sites in Nova Scotia and to the standards generally accepted within Nova Scotia at the time of completion;

4. Off-site impacts have been identified and the applicable site owner and applicable off-site owner(s) have been notified;

5. All treatment and disposal activities have been addressed;

6. Close-out and monitoring confirms that the remedial objectives have been met;

7. All remedial works have met the objectives defined in the Remedial Action Plan of (DATE) and the meeting of these objectives is clearly demonstrated in the close-out report of (DATE);

8. All agreements relating to work carried out have been finalized;

9. Disclosure of any and all limitations associated with the report and conclusions has been made.

The Certificate of Compliance shall identify all of the following:

Site Owner	company name, mailing address, name and telephone number of contact person who has direct access to all reports
Site Operator	name, address and telephone number, if different from above
Site Address	civic address, municipality, county, property identification number, map location (Universal Transverse Mercator Grid method)

NOTIFICATION REPORT

Site Owner: _____
Address: _____
_____
_____

Contact: _____ Phone: _____ Fax: _____

Site Operator: _____
Address: _____
_____
_____

Contact: _____ Phone: _____ Fax: _____

Site Professional: _____
Address: _____
_____
_____

Contact: _____ Phone: _____ Fax: _____

SITE INFORMATION

Map No. (1:50000) _____ Grid _____ Attached _____
Site Sketch Attached: _____ Photos _____

Street/Hwy No.: _____
Community: _____
Municipality: _____
County: _____

Existing Land use: _____ Zoning: _____

Adjacent Land use (N) _____

(E) _____

(S) _____

(W) _____

Proposed Remediation Level _____

Residencies within 200 metres _____, _____metres

Nearest institutional building _____, _____metres

Underground Services (Describe) _____, _____metres

EXISTING GROUNDWATER USAGE

On-site wells (yes/no) _____

Domestic Wells; With-in 30 metres _____ Direction_____

100 metres _____ Direction_____

200 metres _____Direction_____

Municipal/Industrial wells with-in 1 km _____ Direction _____

Anticipated Future Groundwater Usage _____

GEOLOGY/HYDROGEOLOGY INFORMATION

Soil Type/Stratigraphy

_____

_____

_____

_____

Depth to bedrock, _____ metres, Water Table _____ metres

Direction of groundwater flow _____

(Indicate if estimated or calculated)

Hydraulic Conductivity (Overburden) _____

Hydraulic Conductivity (Bedrock) _____

Distance/Direction to nearest surface waterbody, storm sewer or Underground Service _____metres, Describe _____

Receiver Waterbody: _____ Type: marine/fresh water

Ecological Sensitivities (Describe)

_____

_____

CONTAMINANT INFORMATION

Sample No.	Parameter	Matrix	Depth (m)	Value	Units

ESTIMATED QUANTITY OF MATERIAL/MATRIX IMPACTED

Material	Amount	Units	Proposed Remediation/Treatment/Management
Soil			

Groundwater _____ _____ _____

Surface Water_____ _____ _____

Sediments _____ _____ _____

Sludges _____ _____ _____

Attach a site plan indicating all relevant features, including sampling locations, structures, roadways, waterways, direction of groundwater flow and isopleths of the contaminant levels.

Are there any off-site impacts. (Yes/No). If yes, describe below.

_____

_____

_____

March 27, 1996
Dated

original signed by:
Dianne Coish
Acting Deputy Minister